IN THE SPECIFICATION:

Please amend paragraph number **[0002]** as follows:

[0002] State of the Art: Formation coring is a well-known process in the oil and gas industry. In conventional coring operations, a core barrel assembly is used to cut a cylindrical core from the subterranean formation and to transport the core to the surface for analysis. Analysis of the core can reveal invaluable data concerning subsurface geological ~~formations – including~~ formations, including parameters such as permeability, porosity, and fluid ~~saturation – that~~ saturation, that are useful in the exploration for petroleum, gas, and minerals. Such data may also be useful for construction site evaluation and in quarrying operations.

Please amend paragraph number **[0003]** as follows:

[0003] A conventional core barrel assembly typically includes an outer barrel having, at one end, a core bit adapted to cut the cylindrical core and to receive the core in a central opening, or throat. The opposing end of the outer barrel is attached to the end of a drill string, which conventionally comprises a plurality of tubular sections that extends to the surface. Located within, and releasably attached to, the outer barrel is an inner barrel assembly having an inner tube configured for retaining the core. The inner barrel assembly further includes a core shoe disposed at one end of the inner tube adjacent the throat of the core bit. The core shoe is configured to receive the core as it enters the throat and to guide the core into the inner tube. Both the inner tube and core shoe are suspended within the outer barrel and rotate freely with respect to the core bit and outer barrel. Thus, as the core is ~~cut – by~~ cut, by application of weight to the core bit through the outer barrel and drill string in conjunction with rotation of these ~~components – the~~ components, the core will traverse the throat of the core bit to eventually reach the rotationally stationary core shoe, which accepts the core and guides it into the inner tube assembly where the core is retained until transported to the surface for examination.

Please amend paragraph number **[0020]** as follows:

[0020] FIG. 4 is a cross-sectional view of a core bit of an interior configuration according to the present invention and associated core shoe and inner tube as taken along line ~~III-III~~ III-III of FIG. 2;

Please amend paragraph number **[0021]** as follows:

[0021] FIG. 5 is an enlarged partial view of the exemplary core bit shown in ~~cross-section~~ cross-section in FIG. 3;

Please amend the first occurrence of paragraph number **[0023]** that was inserted by Amendment dated October 29, 2003, as follows:

~~**[0023]**~~ **[0022.1]** FIG. 6A is an enlarged partial view of a port of the present invention shown including a pyramidal port inlet;

Please amend the second occurrence of paragraph number **[0023]** as follows:

[0023] FIG. 7 is an enlarged partial view of the exemplary core bit shown in ~~cross-section~~ cross-section in FIG. 3;

Please amend the second occurrence of paragraph number **[0032]** as follows:

[0032] As can be seen in FIG. 2, the throat 14 opens into the bit body 12 at the face surface 20. Disposed on the face surface 20 is a plurality of blades 22. Attached to the blades 22 is a plurality of cutters 30 arranged in a selected pattern. The pattern of cutters ~~30 – shown~~ 30, shown rotationally superimposed one upon another along the bit profile in FIG. ~~3 – includes~~ 3, includes at least one outside gage cutter 32 that determines the diameter of the bore hole cut in the formation. The pattern of cutters 30 also includes at least one inside gage cutter 34 that determines the diameter of the core 200 (shown by dashed ~~line)~~ lines) being cut and entering the throat 14.

Please amend the second occurrence of paragraph number **[0034]** as follows:

[0034] The bit body 12 has an inner, substantially cylindrical cavity 16 extending longitudinally therethrough and bounded by an inside diameter 18. The throat 14 opens into the ~~inner~~ inner, substantially cylindrical cavity 16. Extending into the ~~inner~~ inner, substantially cylindrical cavity 16 of the bit body 12 is the inner tube 7. Disposed at the lower end of the inner tube 7 adjacent the throat 14 is a core shoe 50. The inner tube 7 and core shoe 50 are suspended so as to be able to freely rotate with respect to the core bit 10 and outer barrel 3. The core shoe 50 is configured and located to receive the core 200 as the core 200 traverses the throat 14 and to guide the core 200 into the inner tube 7. The core 200 is then retained in the inner tube 7 until the core 200 is transported to the surface for analysis.

Please amend the second occurrence of paragraph number **[0037]** as follows:

[0037] Drilling fluid circulating in the upper annular region 60 and collecting in the annular reservoir 80 will also flow into the narrow annulus 70. Drilling fluid entering the narrow annulus ~~70 -- the flow split -- will~~ 70, the flow split, will flow therethrough and exit the narrow annulus 70 through an annular gap 72 proximate the throat 14. The flow split can contact, and thereby invade and contaminate, the core 200 as the core 200 traverses the throat 14 and enters the core shoe 50.

Please amend the second occurrence of paragraph number **[0039]** as follows:

[0039] Shown in FIG. 4 is a core bit 100 having features for controlling flow split according to the present invention. The core bit 100 is disposed at the end of an outer barrel (not shown in FIG. 4) of a conventional core barrel assembly. The core bit 100 includes a bit body 112 having a face surface 120. A throat 114 configured to receive a core 200 (shown by dashed ~~line)~~ lines) being cut opens at the face surface 120 and extends into the bit body 112.

Please amend the second occurrence of paragraph number **[0047]** as follows:

[0047] Those of ordinary skill in the art will understand that the narrow annulus 170 extends about the entire circumference of the bit body 112 and, therefore, has a large ~~cross-sectional~~ cross-sectional area open to receive fluid flow from the annular reservoir 180. In contrast, the port inlets 144 are singular, spaced entrances disposed about the circumference of the bit body 112. Thus, increasing the cross-sectional area of the port inlets 144 that can receive fluid flow from the annular reservoir 180 is of critical importance. Numerical studies performed with the aid of a computer indicate that a conical shape 147 at the port inlets 144 can decrease flow split by approximately 44 percent. It will be appreciated by those of ordinary skill in the art that the shape 147 at the port inlets 144 may be of any suitable configuration that increases the ~~cross-sectional~~ cross-sectional area open to receive fluid flow from the annular reservoir 180, such as, by way of example only, a pyramidal shape, as shown in FIG. 6A.

Please amend the second occurrence of paragraph number **[0049]** as follows:

[0049] Referring to FIGS. 6 and 8, the annular reservoir 180 has a radial width 182. The radial width 182, and hence the volume, of the annular reservoir 180 has been significantly increased as compared to the radial width 82 and volume of the annular reservoir 80 in the conventional core bit 10 (see FIGS. 5 and 7). Numerical studies performed with the aid of a computer indicate that increasing the volume of the annular reservoir 180 by up to approximately 70 percent (as compared to the volume of the annular reservoir 80 of the conventional core bit 10) will provide an approximate 19 percent reduction in flow split. Increases in the volume of the annular reservoir 180 beyond about 70 percent may be detrimental to the structural integrity of the core bit ~~100~~ 100, as the corresponding increase in the radial width 182 may weaken the wall of the bit body 112. Those of ordinary skill in the art will understand that the upper limit on the increase in volume of the annular reservoir 180 and on the radial width 182 may vary depending on the design and geometry of the bit body 112 and on the material from which the bit body 112 is constructed.

Please amend the second occurrence of paragraph number **[0054]** as follows:

[0054] Numerical studies performed with the aid of a computer indicate that: a series of annular, rectangular cross-sectional reliefs 177 on the boundary profile 174 as shown in FIG. 9 provides an approximate 10 percent increase in pressure loss; an annular, triangular ~~cross-sectional~~ cross-sectional relief 178 on the boundary profile 174 as shown in FIG. 10 provides an approximate 32 percent increase in pressure loss; and an annular, circular cross-sectional relief 179 on the boundary profile 174 as shown in FIG. 11 provides an approximate 39 percent increase in pressure loss through the narrow annulus 170. Again, increased pressure loss through the narrow annulus 170 directly translates to a reduction in flow split. Any other suitable surface or topographical feature may be used to alter the boundary profile 174 according to the invention in order to introduce flow resistance in the narrow annulus 170. Those of ordinary skill in the art will appreciate that any one of the surface features 176, 177, 178, 179 imparted to the boundary profile 174 will individually increase resistance to fluid flow through the narrow annulus 170. In other words, a surface feature 176, 177, 178, 179 introduced to the boundary profile 174 according to the present invention does not require a second, mating surface feature to increase resistance to fluid flow in the narrow annulus 170, as was suggested in the prior art (see discussion of prior art set forth above).

Please amend the second occurrence of paragraph number **[0055]** as follows:

[0055] A core bit 100 according to the present invention may be manufactured using conventional core bit fabrication techniques. Machining, casting, or other suitable conventional metal forming techniques, or any combination thereof, may be used to form the novel features of the present invention, including: a port inlet 144 having a conical shape 147; a port inlet 144 having a relaxed angle of approach 148; an annular reservoir 180 having an increased radial width 182; and a narrow annulus 170 having a boundary profile 174 with one or more annularly extending squared edges 176, one or more annular, rectangular cross-sectional reliefs 177, one or more annular, triangular cross-sectional reliefs 178, or one or more annular, circular ~~cross-sectional~~ cross-sectional reliefs 179. All of the novel features of the core bit 100 according to

the present invention are integral to the core bit 100 itself, and no modifications to other components of the conventional core barrel assembly, including the core shoe, are required. It will be appreciated by those of ordinary skill in the art that fabrication of the novel features of the core bit 100 does ~~not – for~~ not, for proper functioning of the core bit 100 providing a reduced flow split during a coring ~~operation – depend~~ operation, depend upon the maintenance of a close mating (or contacting) fit between two surfaces rotating relative to one another. Further, those of ordinary skill in the art will appreciate that the novel features of the core bit 100 will not significantly affect the mechanical strength of the core bit 100, as no weak ~~structures – such~~ structures, such as, for example, thin cross-sectioned geometric ~~features – are~~ features, are imparted to the core bit 100.